DESCRIPTION

The AO2904-Q consists of two independent, high gain and internally frequency compensated operational amplifiers, they are specifically designed to operate from a single power supply. Operation from split power supply is also possible and the low power supply current drain is independent of the magnitude of the power supply voltages. Typical applications include transducer amplifiers, DC gain blocks and most conventional operational amplifier circuits.

AEC-Q100 Qualified is available in SOP8 package.

ORDERING INFORMATION

Package Type	Part Number	
SOP8 AEC-Q100 SPQ:3,000pcs/Reel	M8	AO2904M8RQ
		AO2904M8VRQ
Note	V: Halogen free Package R: Tape & Reel Q: AEC-Q100 Qualified	
AiT provides all RoHS products		

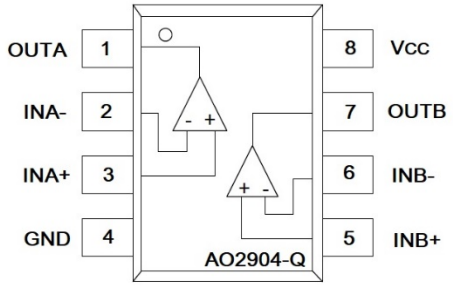
FEATURES

- Internally Frequency Compensated for Unity Gain
- Large Voltage Gain：100Db (Typ.)
- Low Input Bias Current：20nA (Typ.)
- Low Input Offset Voltage：2mV (Typ.)
- Low Supply Current：0.5mA (Typ.)
- Wide Power Supply Voltage：
  Single Supply：3V~36V
  Dual Supplies：±1.5V~±18V
- Input Common Mode Voltage Range Includes Ground
- Large Output Voltage Swing：0V~Vcc-1.5V
- AEC-Q100 qualified with the following results:
  -Device temperature Grade1:-40~125 ℃ ambient operating temperature range;
  -Device HBM ESD classification Level H2;
  -Device CDM ESD classification Level C3B

APPLICATION

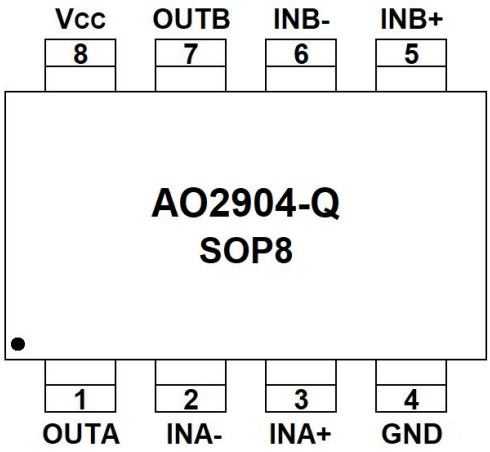
- Speaker system☐
- Switching power supply☐
- Car lighting☐
- OBC and wireless chargers☐
- Battery management system (BMS)☐
- Remote control unit (RCU)

TYPICAL APPLICATION



SOP8

PIN DESCRIPTION



SOP8, M8

Top View

Pin #	Symbol	Functions
1	OUTA	Output, Channel A
2	INA-	Inverting Input, Channel A
3	INA+	Noninverting Input, Channel A
4	GND	Ground Pin
5	INB+	Noninverting Input, Channel B
6	INB-	Inverting Input, Channel B
7	OUTB	Output, Channel B
8	V_{CC}	Supply Voltage

ABSOLUTE MAXIMUM RATINGS

Supply Voltage	+3V~+40V
Input Voltage	-0.3V ~ +40V
Thermal resistance (Junction to air)	136℃/W
Continuous Total Power Dissipation	0.92W
Junction Temperature	-40℃ ~ +150℃
Operating Ambient Temperature Range	-40℃ ~ +125℃
Storage Temperature Range	-55℃ ~ +150℃
Lead Temperature	260/10S℃

Stresses above may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the Electrical Characteristics is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

ELECTRICAL CHARACTERISTICS

At T_A = 25 ºC, bold typeface applies over -40 ºC~125 ºC, V_{CC} = 5V, GND=0V, unless otherwise specified

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Units
Input Offset Voltage	V_{OS}	V_O=1.4V , R_S=0Ω , V_{CC}=5V ~ 30V	-3	2	+3	mV
			-	-	6	
Average Temperature Coefficient of Input Offset Voltage	$\Delta V_{OS}/\Delta T$	T_A=-40~125℃	-	7	-	μV/℃
Input Bias Current	I_B	I_{IN}+ or I_{IN}-, V_{CM}=0V	-	20	150	nA
			-	-	500	
Input Offset Current	I_{OS}	I_{IN}+ or I_{IN}-, V_{CM}=0V	-	5	30	nA
			-	-	150	
Temperature coefficient of input imbalance current	$\Delta I_{OS}/\Delta T$		-	10	-	pA/℃
Input Common Mode Voltage Range	V_{CM}	V_{CC}=30V	0	-	V_{CC}-1.5	V
Supply Current	I_{CC}	T_A=-40~125℃,R_L=∞ , V_{CC}=30V	-	0.7	2.0	mA
		T_A=-40~125℃,R_L=∞, V_{CC}=5V	-	0.5	1.2	
Large Signal Voltage Gain	A_{OL}	V_{CC}=15V , V_O=1V~11V , R_L≥2kΩ	85	100	-	dB

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Units
Common Mode Rejection Ratio	CMRR	DC, V_{CM}=0V~(V_{CC}-1.5) V	60	80	-	dB
Power Supply Rejection Ratio	PSRR	V_{CC}=5V~30V	70	100	-	dB
Channel Separation	CS	f=1kHz~20kHz	-	-120	-	dB
GBW			-	0.7	-	MHz
PM			-	54	-	°
SR			-	0.3	-	V/uS
Output Current	I_{SOURCE}	V_{IN}+=1V, V_{IN}-=0V, V_{CC}=15V, V_O=2V	20	40	-	mA
			10	-	-	
	I_{SINK}	V_{IN}+=0V, V_{IN}-=1V, V_{CC}=15V, V_O=2V	10	15	-	mA
			5	-	-	
		V_{IN}+=0V, V_{IN}-=1V, V_{CC}=15V, V_O=0.2V	12	50	-	uA
Output Short Circuit Current to Ground	I_{SC}	V_{CC}=15V	-	40	60	mA
Output Voltage Swing	V_{OH}	V_{CC}=30V, R_L = 2kΩ	26	-	-	V
			25	-	-	
		V_{CC}=30V, R_L = 10kΩ	27	28	-	V
			26	-	-	
	V_{OL}	V_{CC}=5V, R_L = 10kΩ	-	5	20	mV
			-	-	30	

TYPICAL PERFORMANCE CHARACTERISTICS

Fig1. Voltage Gain

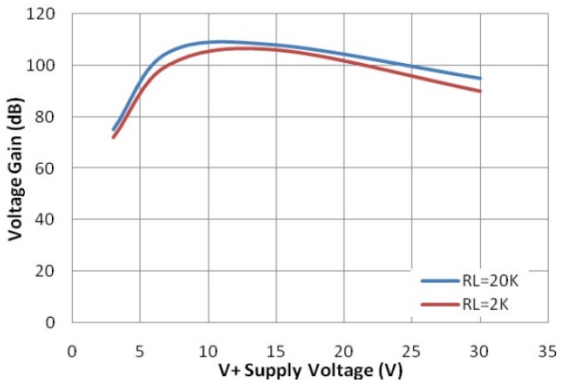


Fig2. Large Signal Frequency Response

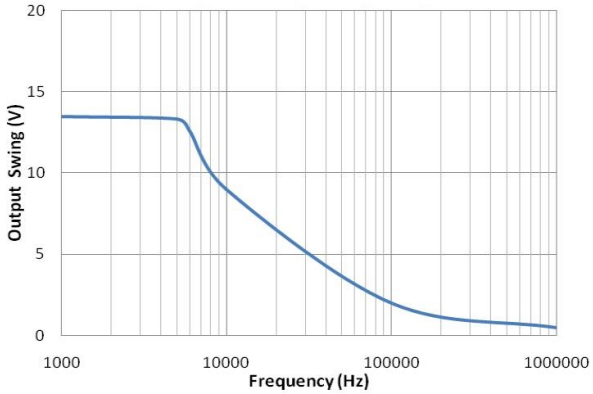


Fig3. Voltage Follower Pulse Response

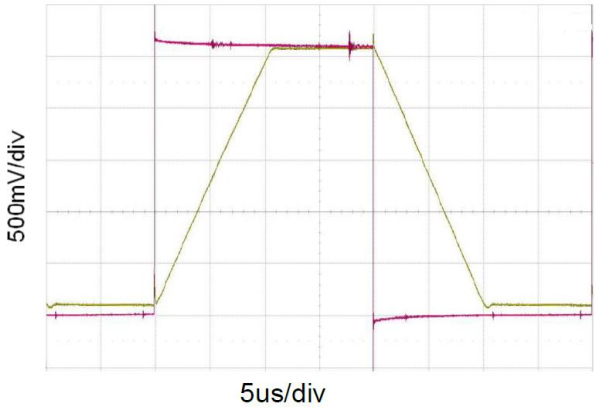


Fig4. Voltage Follower Pulse Response (small singal)

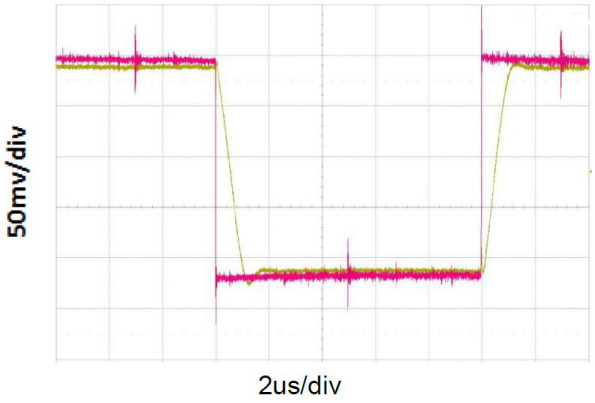
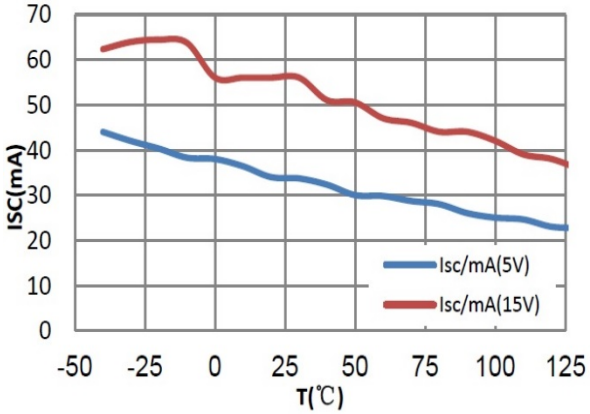
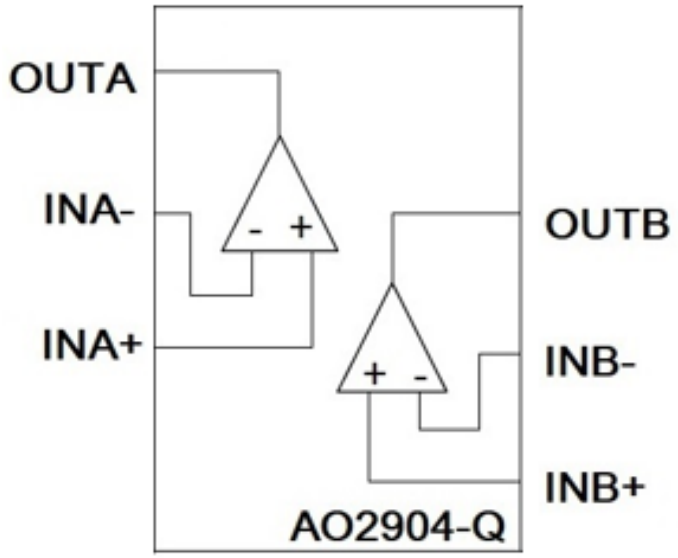


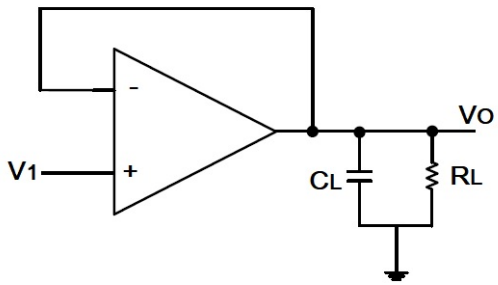
Fig5. Current Limt



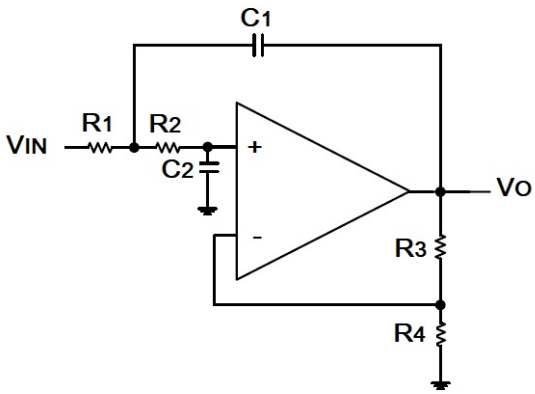
BLOCK DIAGRAM



TYPICAL APPLICATION CIRCUIT



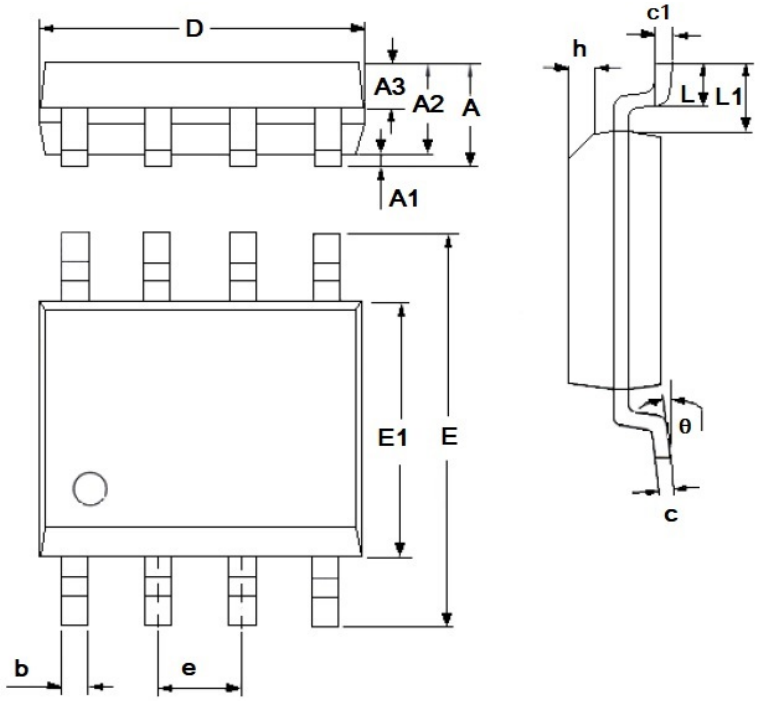
Unity-Gain Amplifier



DC Coupled Low-Pass RC Active Filter

PACKAGE INFORMATION

Dimension in SOP8 (Unit: mm)



Symbol	Millimeters	
	Min	Max
A	1.300	1.800
A1	0.050	0.250
A2	1.250	1.650
A3	0.500	0.700
b	0.300	0.510
c	0.170	0.250
c1	0.250 TYP	
D	4.700	5.100
E	5.800	6.200
E1	3.800	4.000
e	1.270 TYP	
h	0.250	0.500
L	0.400	1.270
L1	1.040 TYP	
θ	0°	8°

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